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TITLE: COMBINATION LAYOUT TOOL

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**CROSS-REFERENCE TO RELATED APPLICATIONS**

This application claims the benefit of U.S. Provisional Application Serial No. 60/243,228, filed October 25, 2000.

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**FIELD OF THE INVENTION**

This invention is for a combination layout tool that incorporates a number of features that can be used by woodworkers and other craftspeople, including novices and professionals, in crafting the details needed to accomplish a multitude of building projects.

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**BACKGROUND OF THE INVENTION**

Heretofore, the only layout tools that were available in the marketplace to woodworkers and other craftspeople in crafting the details needed to accomplish a multitude of building projects were small 45° squares and larger adjustable squares that were not very accurate.

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**SUMMARY OF THE INVENTION**

The layout tool of the present invention provides a permanent pattern especially for use on larger building projects that can be used repeatedly to accurately produce different angles and cuts or layouts.

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In accordance with one aspect of the invention, the layout tool of the present invention provides an accurate way of producing certain angles for larger projects, for example, 22½°, 45° and 67½° angles across 24 inch wide projects.

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In accordance with another aspect of the invention, the layout tool can be used to accurately create incremental angles.

In accordance with another aspect of the invention, the layout tool can be used for automatic layout of rafter tails, birdsmouth cuts and/or ridgecuts having a pitch for example of 4 and 12 pitch and/or 6 and 12 pitch.

In accordance with another aspect of the invention, the layout tool can be used to effortlessly lay out stairs having for example a 10 inch tread and a 7 inch riser for a 2X12 inch stringer.

5 In accordance with another aspect of the invention, the layout tool can be used to produce different stud layouts on different centers, for example, 16 and/or 24 inch centers.

In accordance with another aspect of the invention, the layout tool can be used to accurately create large circles having a diameter for example of between 2 inches and 54 inches in increments for example of 2 inches.

10 These and other objects, advantages, features and aspects of the present invention will become apparent as the following description proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but several of the various ways in which the principles of the invention may be employed.

#### **BRIEF DESCRIPTION OF THE DRAWINGS**

20 In the annexed drawings:

Fig. 1 is a plan view of one form of layout tool in accordance with the present invention;

Fig. 2a is a schematic plan view of a 24 inch deep countertop having two 45° miter joints;

25 Fig. 2b is a plan view of a 24 inch deep countertop having four 67½° miter joints, each of which has a complementary angle of 22½° off the perpendicular;

Fig. 3 is a schematic plan view showing the layout tool being used to accurately create incremental angles from 0° to 90°;

30 Fig. 4 is a schematic plan view showing the layout tool being used to mark a pattern for a birdsmouth cut in a rafter to allow the rafter to seat securely on top of a framed wall;

Fig. 5 is a schematic side elevation view showing a stringer with treads and risers cut therein for use in building stairs;

Fig. 5a is a schematic view showing the layout tool being used to lay out the treads and risers on a stringer to make the tread and riser stringer shown in Fig. 5;

Fig. 6 is a schematic plan view showing the layout tool being used to accurately create circles having a diameter for example of between 2 inches and 54 inches in increments for example of 2 inches; and

Figs. 7 and 8 are schematic plan views showing the layout tool being used to make stud layouts on 16 inch and 24 inch centers, respectively.

### **DETAILED DESCRIPTION OF THE INVENTION**

Referring now in detail to the drawings, and initially to Fig. 1, there is shown one form of combination layout tool 1 in accordance with this invention comprising a triangular shaped member 2 having three side edges 4-6 that intersect at opposite ends to form three corners 7-9. The tool 1 may be made out of a relatively rigid lightweight material such as plastic. In the embodiment shown in Fig. 1, the layout tool has two  $67\frac{1}{2}^{\circ}$  angle corners 7, 8 and one  $45^{\circ}$  corner 9. Also, the layout tool has a perpendicular height H from either  $67\frac{1}{2}^{\circ}$  angle corner 7, 8 to the respective opposite side edge 4, 5 of approximately 24 inches. Adjacent one side edge of the tool is an arcuate finger slot 9 to facilitate grasping with one hand for ease of handling.

Such a tool can be used, for example, to accurately produce two  $45^{\circ}$  miter joints 15 to create a  $90^{\circ}$  outside corner 16 in a 24 inch deep countertop C as schematically shown in Fig. 2a. Also, such a tool can be used, for example, to accurately produce two or more  $67\frac{1}{2}^{\circ}$  miter joints 17 in a 24 inch deep countertop C to create  $135^{\circ}$  outside corners 18 as schematically shown in Fig. 2b. The complement to such  $67\frac{1}{2}^{\circ}$  angles off the perpendicular is  $22\frac{1}{2}^{\circ}$  as further schematically shown in Fig. 2b. From this it will be apparent that the tool 1 can be used to create the exact angle desired to complete the miter.

Moreover, the tool 1 with this angle layout can be used to align a straight edge, facilitating the cutting process when using a skill saw or router.

Referring further to Fig. 1, one of the side edges 4 of the tool extending between the 45° angle and one of the 67½° angles is used as the base line of the tool. This side edge 4 has a notch A closer to the 67½° angle corner 7 than the 45° angle corner 9. In the embodiment disclosed herein, the notch A is actually somewhat closer to the 67½° angle corner 7 than the intersection of a line extending perpendicular from the other 67½° angle corner 8 with the base line side edge 4. Adjacent the side edge 5 opposite the 67½° angle corner 7 are a plurality of incremental angle slots 20-37 in radial alignment with notch A. These incremental angle slots are incrementally spaced apart at incremental angles, for example, of 5°, from 0° as measured from notch A in a direction away from side edge 4 of the tool up to 90° at angle slot 37 which is perpendicular to side edge 4 and in alignment with notch A. Also, additional incremental angle slots may be provided between selected pairs of 5° angle slots, for example, one slot 38 at 22½° as measured from notch A in a direction away from side edge 4, and another incremental angle slot 39 at 67½° as measured from notch A in a direction away from side edge 4. In addition, incremental holes 40, each incrementally spaced 1° apart, may be provided between the 5° angle slots 20-36 as further shown in Fig. 1.

The tool 1 with such incremental angle slots/holes may be used to create virtually any angle from 0 to 90° by placing a pencil mark at notch A of tool 1 and a second mark in any one of the incremental slots 20-39 or holes 40 in angled spaced relation to notch A and connecting the two marks by drawing a continuous line along one of the straight side edges 5 or 6 of the tool.

In addition, tool 1 may be used in locating angles, for example up to 50 feet in length, with reasonable accuracy by pulling a string S over the desired angle, for example the 45° angle slot 28 and then over the notch A, and latching the string up through a triangular slot 45 in tool 1 adjacent notch A as schematically shown in Figs. 1 and 3. This process is especially helpful in creating the perimeter of decks, fences or foundations.

One or more rafter tails/ridge cut patterns may also be formed in the base line side edge 4 of tool 1 in spaced relation from notch A. In the embodiment shown in Fig. 1, two such rafter tail/ridge cut patterns 46 and 47 are provided in such side edge. One of the patterns 46 may for example be a 4 and 12 pitch pattern, whereas the other pattern 47 may for example be a 6 and 12 pitch pattern. Each of the patterns 46, 47 is formed by two straight sides 48, 49 and 50, 51, respectively, intersecting side edge 4 and also intersecting one another at a 90° angle. One of the sides 49, 51 of each pattern 46, 47 is shorter than the other side 48, 50. Also angled slots 52 and 53 are provided in tool 1 in alignment with the respective short sides 49 and 51 of the patterns 46 and 47.

To make these angles, the side edge 4 of tool 1 is placed flush with the bottom edge 55 of a rafter R as schematically shown in Fig. 4. The desired pre-marked rafter tail/ridge cut slot angle 52 or 53 is used to achieve the correct angle for a 4 and 12 pitch or 6 and 12 pitch angle, by pencil marking at the matching points for the correct pitch. The pattern for this cut is made by marking the pattern 46 or 47 which is already aligned with the desired rafter tail mark 52 or 53. The birdsmouth cut 56 is made in the bottom edge 55 of the rafter R to allow the rafter to seat securely on top of a framed wall W as further schematically shown in Fig. 4.

Tread and riser slots 60 and 61 may also be provided in tool 1 for making a perfect tread and riser for use in building stairs. These tread and riser slots 60 and 61 extend at 90° relative to one another, with their inner ends terminating in closely spaced relation from one another and their outer ends terminating in a plane parallel to the side edge 4 of the tool as schematically shown in Fig. 1. The tread slot 60 may have a length, for example, of 10 inches, and the riser slot 61 may have a length, for example, of 7 inches. Also, a tread and riser hole 62 is provided in tool 1 in the same plane as the outer ends of the tread and riser slots 60 and 61. Hole 62 is spaced from the outer end 69 of riser slot 61 a distance corresponding to the distance between the outer ends of the tread and riser slots 60 and 61.

To make a perfect tread and riser stringer T of the type schematically shown in Fig. 5, the base line side edge 4 of tool 1 is positioned along the bottom side 65 of an uncut stringer T' as schematically shown in Fig. 5a. Pencil lines 66 and 67 are then drawn in the tread and riser slots 60 and 61 and a pencil dot 68 is placed in the tread and riser hole 62 as further shown in Fig. 5a. Next the tool 1 is slid along the stringer T' toward the right as depicted in Fig. 5a until the pencil dot 68 from the tread and riser hole 62 is aligned with the bottom edge 69 of the riser slot 61. When thus positioned, a second set of pencil lines can be drawn in the tread and riser slots 60 and 61, followed by another pencil dot 68 in the tread and riser hole 62. Repeating this process will accomplish the complete pattern on the tread and riser stringer for building stairs.

Tool 1 can also be used to draw circles for example from 2 inches in diameter up to 54 inches in diameter in two inch increments by providing a pivot point hole 70 in the tool adjacent corner 7 and a plurality of incrementally spaced marker receiving holes 71 in the tool spaced for example in one inch increments from pivot point hole 70. Holes 70 and 71 are in a common plane in spaced parallel relation to side edge 4 of tool 1. To draw a circle of the desired diameter using tool 1, a screw or nail N is lightly fastened through the pivot point hole 70 onto a surface of the actual project or on a desired material for a pattern as schematically shown in Fig. 6. Next a pencil or other marker is inserted into one of the incremental holes 71 and used to rotate the tool in a circular motion creating the exact circle needed, for example a 20 inch diameter circle CR using the incremental hole 71 spaced 10 inches from the pivot point hole 70 as schematically shown in Fig. 6.

A plurality of spaced apart stud layout slots may also be provided in tool 1 for making different stud layouts for framed walls. In the embodiment shown in Fig. 1, three spaced apart parallel stud layout slots 75, 76 and 77 are provided in tool 1 extending perpendicular to and in closely spaced relation to side edge 4 of the tool. One of the stud layout slots 75 is desirably in alignment with notch A and 90° angle slot 37 so it can also be used in laying out 90° angles on smaller work pieces. Moreover, additional angle slots, for example, 22½°, 45° and 67½°

angle slots 78, 79 and 80 may be provided in tool 1 in closely spaced relation to notch A and in radial alignment with notch A and the corresponding angle slots 38, 28 and 39 adjacent side edge 5 of tool 1 for use in laying out these angles on smaller work pieces.

5           The other two stud layout slots 76 and 77 are spaced in opposite directions from intermediate stud layout slot 75. Stud layout slot 76 may be spaced, for example, 16 inches from intermediate stud layout slot 75, whereas stud layout slot 77 may be spaced for example 8 inches from stud layout slot 75 and 24 inches from stud layout slot 76.

10           To lay out studs with 16 inch centers, for example, the top and bottom wall plates 81 and 82 for a framed wall 83 are first marked at 84 using the intermediate stud layout slot 75 as schematically shown in Fig. 7. Then the top and bottom wall plates 81 and 82 are marked at 85 using the stud layout slot 76 which is located 16 inches from and parallel to the stud layout slot 75. Next the tool 1 is moved along the wall plates 81 and 82 to line up the stud layout slot 75 (or notch "A" in alignment therewith) with the second mark 85, and a new mark is made in the 16 inch center slot 76, repeating this process all along the wall plates 81 and 82.

15           For a 24 inch center stud layout, the top and bottom wall plates 81 and 82 are marked at 86 using the slot 77, which is located 8 inches from the slot 75 and 24 inches from the slot 76. Then the slot 76 is marked at 87. Next the tool 1 is moved along the wall plates 81 and 82, lining up the 24 inch center slot 77 with the second mark 87 and repeating the process. Most carpenters would place an "X" to the right of each pencil mark, indicating the actual location for the stud.

20           Although the invention has been shown and described with respect to certain embodiments, it is obvious that equivalent alterations and modifications will occur to others skilled in the art upon the reading and understanding of the specification. In particular, with regard to the various functions performed by the above described components, the terms (including any reference to a "means") used to describe such components are intended to correspond, unless otherwise indicated, to any component which performs the specified function of the

described component (e.g., that is functionally equivalent), even though not structurally equivalent to the disclosed component which performs the function in the herein illustrated exemplary embodiments of the invention. In addition, while a particular feature of the invention may have been disclosed with respect to only one embodiment, such feature may be combined with one or more other features of other embodiments as may be desired and advantageous for any given or particular application.

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